Enterprise Platforms and Integration Concepts in Cooperation with Communication-Systems
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Bachelor's project for the winter semester 2006/2007

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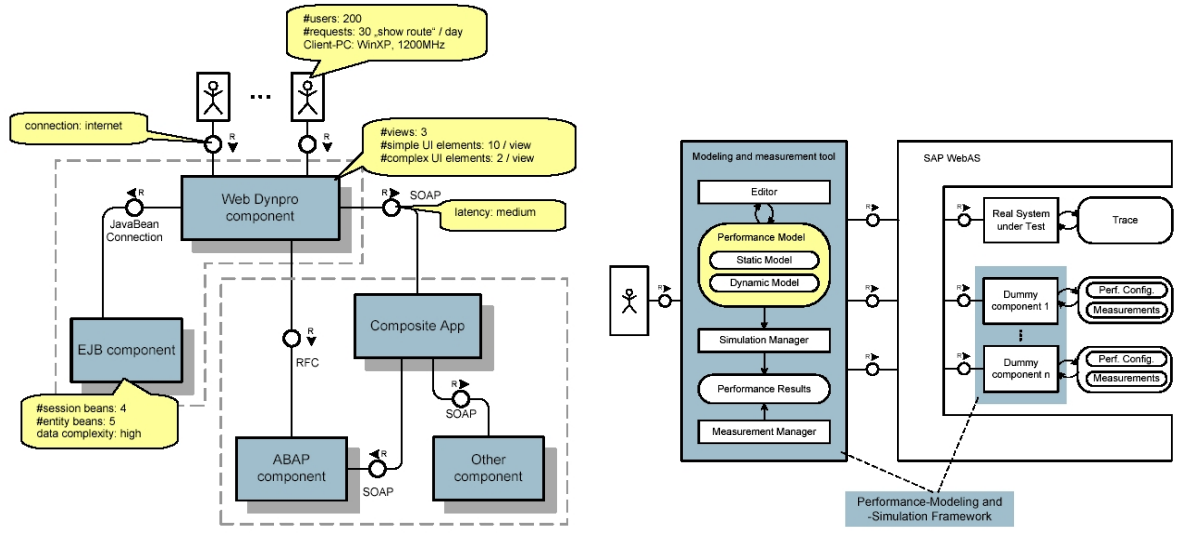
Performance Simulation and Modeling for SAP NetWeaver Applications

Project Background

Performance is a major aspect of enterprise applications and thus should be addressed in the engineering process as early as possible. A prototype of a tool for performance simulations of NetWeaver applications in the analysis and design stage has been developed in a previous bachelor's project.
The tool enables defining parameters characterizing the application's performance behavior for the components in question. These are represented by dummy-components mimicking the performance relevant behavior of their real counterparts. The simulation takes place within the NetWeaver application server in order to attain an accurate approximation of the real system's performance. In this context, SAP's Invoice Management System served as a real-world case study. For the success of the last project, it was crucial to receive SAP's feedback on our modeling and evaluation techniques and to be aware of the internal characteristics of NetWeaver applications. This close relationship will be continued with knowledge exchange, first-hand feedback from Walldorf and Belfast and also real world business applications provided by SAP.



The left figure shows how a sample scenario in this project could look like. Additionally to the depicted static structure a sequence chart is necessary for running the simulation.
The right picture shows the existing modeling and simulation framework, which will be extended during this project.

Research Challenge

- Simulation of components during their design phase
- Extension to SOA & Composite Applications
- Describing components by their performance attributes
- Analytical Modeling (Timed Petri Nets, Queuing Networks)

Project Prep

The existing work has to be studied. Good Understanding will be shown by the student by giving short presentations. Furthermore the following skills will be trained during the preparation:

- Eclipse and its plug-ins
- Some basic knowledge of ABAP
- Getting acquainted with an SAP application to be examined
- Performance basics
- J2EE
- Quantitative Analysis with FMC-QE (Fundamental Modeling Concepts – Quantitative Evaluation)

Project Goals & Project Execution

The existing work will be tested and validated. Examining another reference application from SAP using J2EE technology and comparing the simulated results with the measured ones will achieve this.
Currently the simulator only considers calls between components as well as calls to databases. This concept will be extended to CPU and memory consumption enabling the tool to give more realistic predictions for performance.
Adding simulated user behavior as well as connection of existing applications with simulated ones will further enhance the value of the perfact-tool. That way it becomes easy to develop additional components for existing software landscapes. Also Composite Applications, which means applications on top of other applications, can be more reliable simulated.
Using analytical modeling and simulation techniques will allow approaching the goal of reasonable performance prediction from two directions.

Project location

The project will be running at the HPI in Potsdam. A short visit of all project members to SAP in Walldorf is likely.

Contact

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